

Marcinkiewicz exponents and jump problem for Beltrami equation

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Abstract

© 2017, Allerton Press, Inc. Marcinkiewicz exponents that were introduced by the author before are applied here to solving boundary-value jump problem on non-rectifiable curve for one special case of the Beltrami equation.

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Keywords

Beltrami equation, boundary-value problem, fractal, Marcinkiewicz exponent, nonrectifiable curve, Riemann problem

References

- [1] Vekua, I. N. Generalized Analytic Functions (Nauka, Moscow, 1988) [in Russian].
- [2] Monakhov, V. N. Boundary-Value Problems with Free Boundaries for Elliptic Systems of Equations (Nauka, Novosibirsk, 1977) [in Russian].
- [3] Polozhii, G. N. Generalization of Analytical Functions of Complex Variable Theory (Naukova Dumka, Kiev, 1973) [in Russian].
- [4] Tungatarov, A. B. "Properties of Certain Integral Operator in Classes of Summable Functions", Izv. AN Kazakh. SSR. Ser. fiz.-matem. 132, No. 5, 58–62 (1985) [in Russian].
- [5] Tungatarov, A. B. "About Application of Some Integral Operator for the Theory of Generalized Analytic Functions", Izv. AN Kazakh. SSR. Ser. fiz.-matem. 134, No. 1, 51–54 (1987) [in Russian].
- [6] Abreu-Blaya, R., Bory-Reyes, J., and Pena-Pena, D. "On the Jump Problem for β -Analytic Functions", Complex Variables and elliptic equat. 51, No. 8–11, 763–775 (2006).
- [7] Abreu-Blaya, R., Bory-Reyes, J., and Vilaire, J.-M. "A Jump Problem for β -Analytic Functions in Domains with Fractal Boundaries", Revista Matem. Complutense 23, 105–111 (2010).
- [8] Abreu-Blaya, R., Bory-Reyes, J., and Vilaire, J.-M. "The Riemann Boundary Value Problem for β -Analytic Functions over D-Summable Closed Curves", International J. of Pure and Appl. Math. 75, No. 4, 441–453 (2012).
- [9] Gakhov, F. D. Boundary Value Problems (Nauka, Moscow, 1977) [in Russian].
- [10] Muskhelishvili, N. I. Singular Integral Equations (Nauka, Moscow, 1962) [in Russian].
- [11] Lu, Jian-Ke. Boundary Value Problems for Analytic Functions (Singapore, World Scientific, 1993).
- [12] Kats, B. A. "The Riemann Problem on a Closed Jordan Arc", Soviet Mathematics 27, No. 3, 68–80 (1983) [in Russian].
- [13] Kats, B. A. "The Riemann Problem on an Open Jordan Arc", Soviet Mathematics 27, No. 12, 30–38 (1983) [in Russian].
- [14] Kats, B. A. "The Riemann Boundary Value Problem on Non-Rectifiable Curves and Related Questions", Complex Variables and Elliptic Equat.: An Int. J. 59, No. 8, 1053–1069 (2014).
- [15] Falconer, K. J. Fractal Geometry (Wiley and Sons, Chichester, 2014).

- [16] Tricot, C. *Curves and Fractal Dimension* (Springer-Verlag, New York, 1995).
- [17] Kolmogorov, A. N., Tikhomirov, V. M. "e-Entropy and e-Capacity of Sets in Function Spaces", *Usp. Mat. Nauk* 14, No. 2, 3–86 (1959) [in Russian].
- [18] Harrison, J., Norton, A. "The Gauss–Green Theorem for Fractal Boundaries", *Duke Math. J.* 67, No. 3, 575–588 (1992).
- [19] Kats, D. B. "Marcinkiewicz Exponents and Their Application in Boundary-Value Problems", *Russian Mathematics* 58, No. 3, 57–59 (2014).
- [20] Kats, D. B. "Local Marcinkiewicz Exponents and Their Application", *Uchen. Zap. Kazan. Univ. Ser. Fiz.- Mat. Nauki* 156, No. 4, 31–38 (2014) [in Russian].
- [21] Stein, E. M. *Singular Integrals and Differential Properties of Functions* (Princeton Univ. Press, Princeton, 1970; Mir, Moscow, 1973).
- [22] Katz, D. B. "New Metric Characteristics of Non-Rectifiable Curves with Applications", *Sib. Math. J.* 57, 364–372 (2016) [in Russian].
- [23] Markushevich, A. I. *Selected Chapters in the Theory of Analytic Functions* (Nauka, Moscow, 1976) [in Russian].
- [24] Dolzhenko, E. P. "On 'Erasing' of Singularities of Analytic Functions", *Usp. Mat. Nauk* 18, No. 4, 135–142 (1963) [in Russian].
- [25] Samko, N. G., Samko, S. G., Vakulov, B. G. "Weighted Sobolev Theorem in Lebesgue Spaces with Variable Exponent: Corrigendum", *Armenian J. Math.* 3, No. 2, 92–97 (2010).
- [26] Karlovich, A. Yu., Spitkovsky, I. M. "The Cauchy Singular Integral Operator with Weighted Variable Lebesgue Spaces", *Operator Theory: Advances and Appl.* 236, 275–291 (2013).